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Agile Project Management for Library Service Innovation

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Abstract - **Agile Project Management (APM) has reshaped many sectors, encouraging agility, teamwork, collaboration, and incremental progress. Library services through the delivery of services, technology changes, and even user expectations can change quickly, and the clear advantages of using APM would assist considerably more with enhancing the innovation of services. This paper outlines the belief that Agile practices can assist in the management of library projects, and explores how APM can support the concepts of service development, user engagement, and ongoing innovation. In this research, we explore case studies of libraries that utilize Agile practices and detail the key aspects that enabled their success, the challenges they faced, and their ultimate outcomes. We develop a list of actionable ideas for practitioners in libraries and show how libraries can use Agile practices to remain relevant and can respond to their emerging communities. With the merging of Agile practices with innovations in library services, this paper supports the ability for greater strategies for innovative management for libraries in the future.**

Keywords: **Agile Project Management, Library Services, Service Innovation, User Engagement, Library Management, Continuous Improvement, Collaborative Development, Library Technology, Project Lifecycle, Service Delivery Models**

I. INTRODUCTION

The Nature of Agile Project Management

Agile Project Management (APM) is a method of managing projects that provides a flexible and iterative way of project management (Stoddard et al., 2019. A flexible Project Management approach, like APM, deals with uncertainty and dynamic environments differently than traditional management approaches. APM was first established as a management principle in the early 21st century within the context of software development under the Agile Manifesto, which focuses on the need to enhance collaboration, flexibility, and customer-inclusive outcomes. APM evolved in response to the limitations and challenges of traditional management methods that may not work well with dynamic environments. While traditional project management may work on a linear and fixed approach to manage projects (called 'waterfall principles'), APM works in short cycles (sprints), iteratively, and allows for corrections based on feedback. An iteration, in APM, gives teams continuous feedback and the opportunity to let a working product evolve based on a real-time necessity to change. Agile principles emphasize self-organizing teams that work best with constant communication and work on delivering small but usable increments. Agile management principles have been implemented in various fields beyond just software development, including marketing, construction, healthcare, and libraries (in poly ethnological forms) (Beecham et al., 2021).

Significance of Innovation in Library Services

Since their inception, libraries, in all shapes and sizes, have been viewed as a cornerstone of community education and cultural engagement. With rapid advances in technology, changes in user needs, and increased competition from digital services, libraries need to adapt traditional models of library service if they are to remain relevant (Bimal & Dhamala, 2024). The significance of innovation in library services cannot be overstated. Libraries need to continue to serve diverse communities by embracing change and innovation by providing new services, enhancing the user experience, and streamlining the processes they use to carry out operations

(Hinderks et al., 2022. Libraries may need to take new technologies into account, reduce the time and resources that library users have to spend to interact with library services, and make the services they provide in line with what all users now expect (Chittipedhi et al., 2025). Strong innovative practice can serve users in libraries in many ways, improve users' access to information they seek, and ultimately allow libraries to be more effective organizations. Here, Agile Project Management provides libraries and a framework for community services for innovation (Edwards, 2018).

Objectives and Scope of the Study The object of this report is to study the utilization of Agile Project Management to support service innovation in libraries. Libraries are being challenged to update their format and to meet the wants and needs of their user community. In this study we want to analyze the use of Agile principles to improve the design and delivery of library services. Through looking at cases, applications, and theoretical models, we will outline some of the advantages and potential challenges of Agile adoption (Forsman, 2017). The report will provide a means to explore various methods and approaches to overcome some of the barriers identified and provide insights for library professionals who want to utilize Agile methods (Niemi-Grundström,2014). The scope of this research is limited to public and academic libraries that have implemented, or are in the process of implementing, Agile principles. This report will highlight the use of Agile in library service improvement initiatives, focusing on areas such as resource management, user engagement, digital engagement, and service delivery. The application of Agile will need to be framed around the governance and cultural shifts that managing a library will need to embrace (Gandomani et al., 2020).

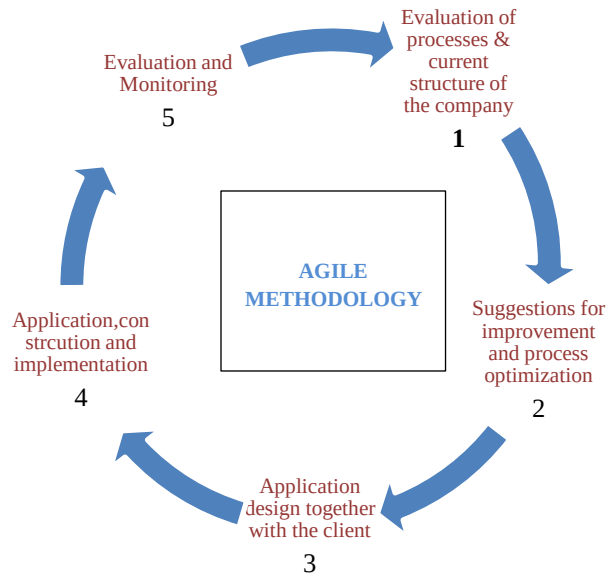


Fig. 1 Agile Project Management Framework for Library Service Development

Fig 1 illustrates the Agile Project Management framework in the context of the development and delivery of library services. It shows an iterative process using feedback after each sprint (a short development cycle) that contributes to the greater project. It's likely that there are also images representing user feedback loops, working with cross-functional teams, and working together to continuously improve. It represents the application of Agile processes to developing library services with the intent of developing services that meet users' needs, can be implemented quickly, and improve the processes by which we can deliver these services.

II. Literature Review

Agile Methods and their Use in Different Sectors

Agile methods have been embraced throughout a number of sectors (e.g., education, health care, manufacturing) because they are flexible, efficient, and focused on the customer (Williams, 2013). While they were developed for software projects, there are various frameworks of Agile (Scrum, Kanban, and Extreme Programming (XP)) that can help teams break down complex work into bite-sized parts, iterate quickly, and adjust to feedback from the usability testing of customers. Agile methods advocate for continuous communication and collaboration, and leverage opportunities for adaptation, creating a space to optimize solutions in which the requirements change dynamically. For example, in health care, Agile methods were used to improve nurse capacities to provide patient care by allowing them to iterate and respond to the skills and demand in real time(Chang , 2010). In manufacturing, Agile methods were applied to reduce time to market by focusing on processes associated with production, design, and delivery (Moedt van Bolhuis et al., 2023). So, the flexibility of Agile methods made it a viable solution for industry areas wanting to foster and facilitate new developments quickly, but also link them to an equally constraining timeframe (Babatope et al., 2022). Similarly, in the education sector and in libraries specifically, there has been acknowledgement that Agile can assist in generating innovative solutions to evolving needs, in tandem with changing user needs. Libraries were once governed by rigid processes for managing services and resources, but they have started to acknowledge how Agile's flexible and iterative processes can be a useful mode to work through service management and development (Gharbi et al., 2024).

1. Time-to-Market (TtM)

This equation measures how long it takes to develop a new service.

$$TtM = Total\ Sprints \times Sprint\ Duration$$

Where:

- **TtM Total Time-to-Market**: The overall time required to launch the new service.
- **Total Sprints** = The total number of sprints required to complete the project. In Agile, a sprint is a short, time-boxed period during which specific tasks or features are

developed. The number of sprints depends on the complexity and scope of the project.

- **Sprint Duration** = The time it takes to complete one sprint, typically measured in weeks or days. Sprint duration is fixed and agreed upon at the beginning of the project. For example, if each sprint lasts 2 weeks, and the project requires 5 sprints, the total time-to-market would be 5×25 times 25×2 weeks.

III. Methodology

3.1 Qualitative Case Study or Mixed Methods

The research design of this study will be in the form of a qualitative case study. A qualitative case study design is appropriate to explore libraries using Agile Project Management methodologies. Case studies can provide insight into how an approachable and flexible Agile style is utilized in real-life situations and are appropriate for developing qualitative information concerning the libraries' adjustments to Agile adoption (Jain & Babu, 2024). The study is interviewing and exploring a few libraries successfully using Agile in their service development and delivery process to gain richer qualitative information and explain the myriad of challenges and successes experienced by library practitioners. Another data collection option would be to adapt a mixed methods study to accompany the qualitative data collection (John et al., 2024). Employing a mixed-methods study to analyze the experiences of libraries in their process of adopting Agile Project Management methods would involve collecting both qualitative data (interviews and open-ended surveys) and also utilizing quantitative data (service usage, time-to-delivery, user satisfaction) as related to the process of Agile being adopted as an effective way to develop library services. Using both qualitative and quantitative data would facilitate a good overview of the experiences of changes to management, and methods of developing services would assist in framing the perspective of how Agile practices might impact management, service development, and user engagement.

3.2 Data Collection: Interviews, Surveys, and Case Studies from Libraries Using Agile

Utilizing a mixed methods design allows for triangulation in data, which results in findings that are both reliable and trustworthy. Further, this design gives a more complete picture of the library's internal processes (qualitative) and outcome measures (quantitative) that are often sought after by organizations that want to incorporate Agile methodologies into their own organizations. Data Collection: Library Interviews, Surveys, and Case Studies of Agile Libraries

This study will use qualitative and quantitative data collection strategies that will provide the data that will inform the study and capture different data points associated with the Agile framework for implementation and the consequent outcome of an improved library service (Jordan-Makely, 2019).

Interviews: Semi-structured interviews will be conducted with appropriate library managers, project leaders, and library staff who took part in the implementation of the Agile framework in their institution. Interviews will consist of asking library staff to describe their experiences with the development of Agile models, including how this shift was managed, perceived benefits or challenges, and how these changes affected library service delivery. During the interview, we will discuss general reflections on experiences, share specific instances of successful Agile projects, and discuss the perceived challenges that were faced before obtaining these final outcomes. The semi-structured interviews will also investigate organizational culture, staff engagement and participation, and how decisions were made while pursuing Agile (Lewis, 2022). Surveys: Surveys will be distributed to a larger audience of library staff and users to obtain quantifiable data to evaluate the overall results achieved through the adoption of Agile. The surveys will ask libraries staff and users questions concerning their satisfaction with new library services, efficiencies in service delivery, and whether/how Agile practices changed their communications and collaborations within teams (Obuezie & Alex-Nmecha, 2023). This will demonstrate a quantitative means for measuring the impact of Agile on library operations and service delivery (Stoddard et al., 2019; Sutton & Palmer, 2020). Case Studies - Case studies provide rich descriptions of how Agile was applied to specific projects, which may have included collaborating on designing new services, initiating a technology project, or enhancing management of resources. The case studies will include relevant factors that contributed to the effective implementation of Agile activities including leaders' engagement, members training, and stakeholder participation. The case studies will also document the barriers libraries experienced when implementing agile, such as resistance to change, resourcing challenges, and learning to do work differently using Agile (Lal & Clear, 2021).

IV. Agile Project Management in Library Services

Agile Project Management (APM) is primarily centered on principles and practices such as iteration, collaboration, flexibility, and user-centered development. APM breaks work down into short, iterative cycles called sprints (Uzwyshyn, 2023). Libraries employ Agile in their service delivery, which supports libraries in continuously improving their services. Collaboration occurs between teams and library users, ensuring that libraries are delivering services aligned with user needs. Agile can be flexible in application for libraries because they can adapt and change in response to shifting demand for services or technologies. Agile approaches provide libraries with constant user feedback, helping them to continuously assess and improve services so that they can remain relevant and effective (Taylor & Kuo, 2020). Libraries have taken on Agile approaches often with the intention of delivering better services and improved service delivery (Taylor & Kuo, 2020). For example, the

University of Huddersfield Library in the UK used Agile as a strategy for improving their library catalog in an iterative development process in order to better serve their user community. Sacramento Public Library (USA) used Agile as their foundation for redesigning their library website. After every Sprint they incorporated feedback from users, which enhanced the overall usability of their web platform. The State Library of Queensland in Australia used an Agile approach to build a new digital archive platform and developed this platform with user feedback.

V. RESULTS AND DISCUSSION

Incorporating Agile Project Management (APM) approaches into libraries positively impacts the development and delivery of service innovation and improvement by giving libraries the agility and responsiveness to adjust to evolving patron needs in response to a rapidly changing environment. The frequent iterations of work give Libraries the opportunity to develop and adapt services, based on constant iterations of library user feedback, and result in a much more user-centered service delivery process. One of the more significant changes a library observed with the change to Agile was the increase in user satisfaction. Libraries that implemented APM were able to quickly adapt services and products based on users. This meant a more tailored user experience that was often lively and relevant.

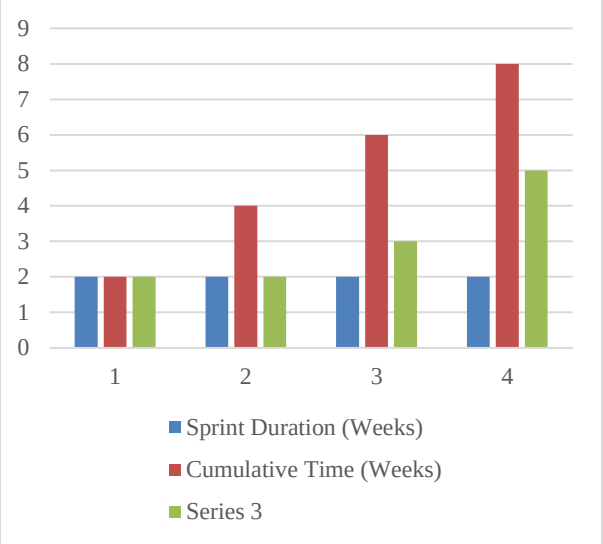
TABLE I TIME-TO-MARKET RESULTS AND SERVICE PERFORMANCE

Sprint Number	Sprint Duration (Weeks)	Cumulative Time (Weeks)	User Satisfaction (Scale 1-5)	Service Quality (Pre vs Post)
1	2	2	4	Pre: 3.5, Post: 4.0
2	2	4	4.2	Pre: 3.7, Post: 4.1
3	2	6	4.5	Pre: 3.8, Post: 4.3
4	2	8	4.7	Pre: 3.9, Post: 4.4

Table I shows the key indicators for measuring progress and performance of the Agile task. The metrics included are the Sprint Number, Sprint duration (in weeks), and Cumulative Time spent delivering the service after each sprint. It also captures User Satisfaction against a scale of 1 to 5 and compares Service Quality pre- and post-Agile implementation. These measures will allow us to assess the effect Agile practice has on both the efficiency of service delivery and the quality of the service delivered overall.

Whether by integrating user feedback constantly or offering service refreshers in between service cycles, libraries were able to effectively increase their user-facing service level, supporting enhanced digital access, as well as a direct impact on services that matched community needs. With libraries realizing more user-centered innovation, not only had they improved user satisfaction, but also added relevance and engagement to the library's identity locally and in the community. Based on the consideration of pre- and post-Agile adoption metrics, considerable positive changes in service quality and efficiency are shown. Overall, before Agile, libraries had unwieldy, long periods of development for new services, which kept them from responding to service demand or needs. After libraries joined the Agile movement, they experienced considerable decreases in time-to-market for new services, as new projects could be broken down into smaller components that could be rapidly tested and adapted. There was also increased user satisfaction as users were encouraged to give feedback, and libraries ensured they were internally optimizing each service with embedded feedback mechanisms based on actual usage and demands. Finally, libraries had considerable gains in service quality; the Agile movement was rooted in the idea of continuous improvement, thereby allowing ongoing changes in services (both physical and digital).

Key success factors of Agile adoption in Libraries include strong leadership, a culture of collaboration, and a commitment to continuous improvement. Libraries that engaged in Agile development often had designated project champions who advocated for Agile processes and would help staff transition into Agile practices. Creating an open, collaborative environment where staff from multiple departments worked together helped ensure that Agile processes were becoming part of the regular routines within the library. Libraries also shared (and appreciated) that their Agile projects were aligned with the strategic goals of their organizations, helping their innovations directly fit into the library's mission and vision. Still, it's not as if there weren't challenges associated with the introduction of Agile. One of the greatest challenges for libraries was a resistance to change. Staff who had been accustomed to traditional ways of working and project management faced challenges switching to the iterative and flexible nature of Agile. Libraries made substantial investments in staff training, as well as staff support, when transitioning to new roles as a way of supporting the selection of Agile methodology. Another challenge was allocating resources for Agile because it often involves teams, and there is time involved with every sprint. In libraries with limited staffing or budgets, it would not be possible to allocate time to projects that would allow for successful Agile implementation. Libraries used creativity to find ways to provide time for staff to participate in Agile teams while still performing their regular responsibilities. Even with these barriers to adopting and implementing Agile, the responses and outcomes that libraries have received to their adoption of Agile have been overwhelmingly positive, in terms of improved service delivery, increased user satisfaction, and operational efficiencies.



Graph. 1 Time-to-Market: Sprint vs Cumulative Time

Graph 1 illustrates how total service delivery time increases (cumulatively) with each sprint in an Agile project. The X-axis has the sprint number, and the Y-axis has the cumulative time (weeks) to deliver the service. This graph indicates how time accumulates to complete the project, showing how iterations of time spent building in an Agile project relate to the delivery time of the service. It also allows you to evaluate how effective and fast the project is being developed.

VI. Recommendations

6.1 Best Practices for Implementing Agile in Library Service Innovation

When implementing Agile in library service innovation, it is essential for libraries to have some prior understanding of Agile principles and how they relate to library objectives. One best practice is to initiate small pilot projects. This allows libraries to implement Agile methods in a limited and manageable way, ensuring success or failure can be determined before more extensive adoption. It would be important to focus on iterative development in these pilot projects, specifically by developing services in small increments. It allows libraries to get user feedback quickly and repeatedly while making adjustments depending on the user's needs.

Another best practice is to create a co-operative cross-functional team where library staff work closely with IT colleagues and a community of users. Agile requires library staff and IT members to work side by side. Having an interdisciplinary team will create an environment where team members see an item of user service delivery through many different lenses to be sure they are working on user-centric service delivery.

Following these Agile best practices, it is equally important to communicate well with your team members and with your library users. Incorporating opportunities for check-ins, sprint reviews, and feedback is important throughout the Agile process, and it should be made clear that everyone on your team is expected to be available for collaborative work and discussions in these times to make sure users' expectations are being met. Finally, libraries should always prioritize feedback from UGC research all the way through the agile process to create library services that are timely and relevant to the community.

6.2 Overcoming Typical Barriers to Agile Adoption

Resistance to change is considered one of the primary barriers to Agile adoption in libraries. Library leaders need to help staff see how Agile aligns with the library's mission, not just with buzzwords. Management should arrange regular, interactive learning sessions where teams explore Agile principles, handy tools, and specific techniques. Change is gradual, and leaders should consider scheduling protected time and offering ongoing encouragement, so libraries reinforce learning not just once, but in manageable bursts over months. Engaging staff from the start makes the difference. Invite diverse team members to co-design the rollout and empower them to pilot the first agile project. When people help shape the new structure, they're less likely to resist and more likely to feel proud of the evolved workflows. Resource questions are real, especially in libraries where every hour and every dollar are budget line items. First, assess how many people and how much money the library can gently reassign. If the number is small, no worries Agile shines in small, focused bursts. Libraries can choose bite-sized, capital-free tweaks, like daily stand-ups and monthly reflections, that refine services without sudden expense. Creative reallocation using a few hours or shared tools turns existing teams into Agile champions over time.

6.3 Summary of Findings

Libraries that applied Agile Project Management (APM) found that they were able to develop and refine their services at a much better speed, including adapting services based on user feedback at all stages of service delivery. The member libraries highlighted many benefits to adopting Agile, namely, faster development time of new services, enhanced communications between departments, and greater user satisfaction; nevertheless, challenges such as resistance to change, lack of resources, and the need for staff training were also mentioned as barriers to the successful adoption of Agile. If our evidence is validated, it illustrates the potential of Agile as a model for library service innovation in the future. Libraries could use Agile in managing library service and enable their library to adapt to the emerging technologies and rapidly changing service expectations of library users. By adopting Agile into managing library services, library management could provide a platform to build a more adaptable and responsive organization to the changing demands and other external stimuli. Agile's emphasis and practice of continuous improvement would also furnish libraries with a more changeable platform for continuous innovation, which ultimately has the potential to help libraries facilitate their relevance in an increasingly digital and information-driven world. Also, the results suggest that

library management should encourage collaborative and flexible organizations. Libraries that adopt Agile will be able to deliver more personal and user-focused services that respond to the needs of a diverse community of users. Furthermore, the use of Agile could improve the collaboration of library staff, its teams, and some external user stakeholders, thus allowing for improved project outcomes and a collegial organization.

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